

YALE (L.M.)

CERTAIN GENERAL CONSIDERATIONS

RESPECTING THE

MECHANICAL TREATMENT OF CHRONIC
DISEASES OF THE JOINTS.

WITH ESPECIAL REFERENCE TO

THE USE OF TRACTION.

BY

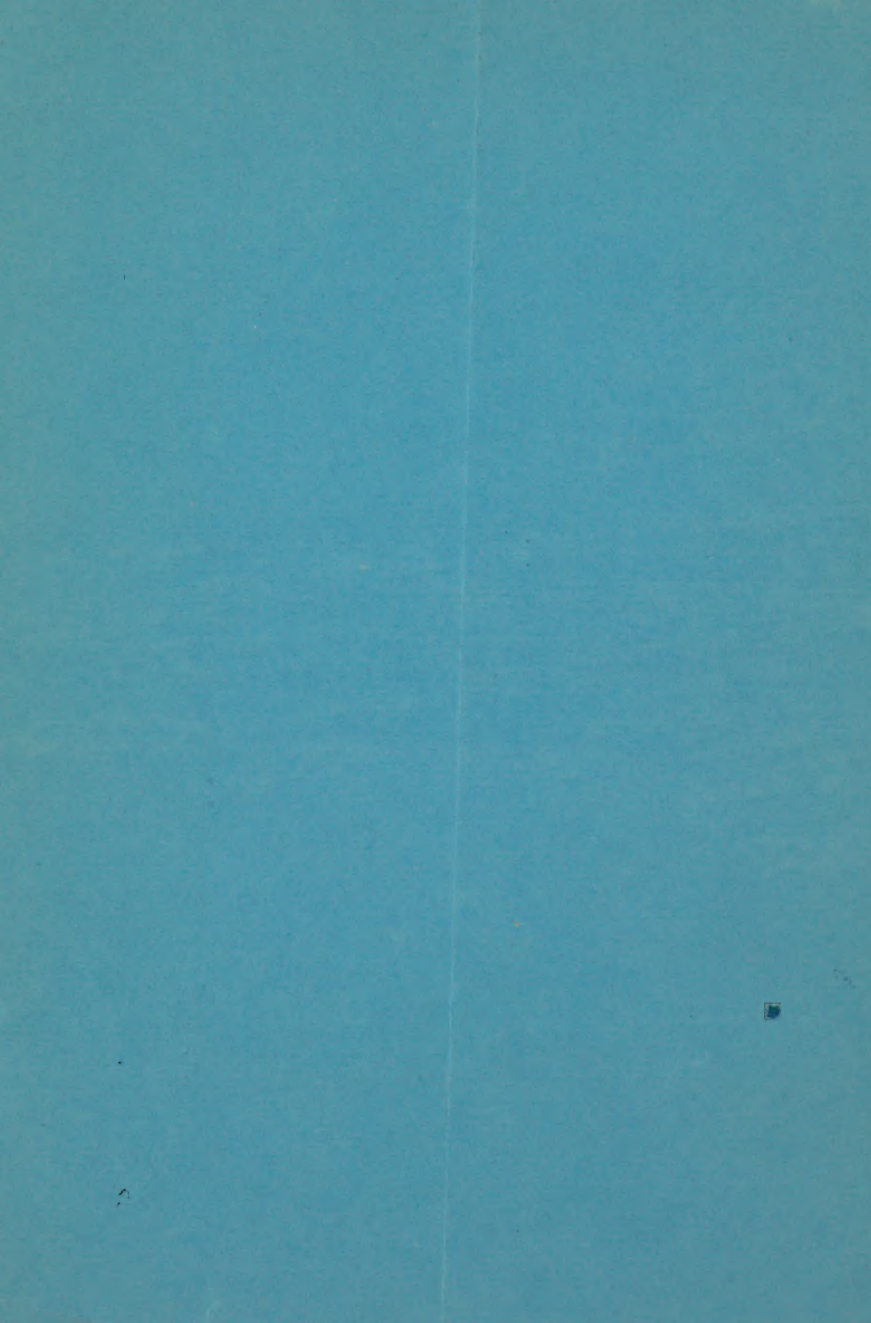
Completed
L. M. YALE, M.D.,

SURGEON TO BELLEVUE HOSPITAL; LECTURER ADJUNCT UPON
ORTHOPEDIC SURGERY IN THE BELLEVUE HOSPITAL
MEDICAL COLLEGE.

Reprinted from THE MEDICAL RECORD of January 12, 1878.

NEW YORK:
TROW'S PRINTING AND BOOKBINDING CO.,
205-213 EAST 12TH STREET.
1878.





CERTAIN GENERAL CONSIDERATIONS

RESPECTING THE

MECHANICAL TREATMENT OF CHRONIC DISEASES OF THE JOINTS.

WITH ESPECIAL REFERENCE TO

THE USE OF TRACTION.

BY

L. M. YALE, M.D.,

SURGEON TO BELLEVUE HOSPITAL; LECTURER ADJUNCT UPON
ORTHOPÆDIC SURGERY IN THE BELLEVUE HOSPITAL
MEDICAL COLLEGE.

Reprinted from THE MEDICAL RECORD of January 12, 1878.

NEW YORK:

TROW'S PRINTING AND BOOKBINDING CO.,

205-213 EAST 12TH STREET.

1878.



Yale, L. W.,

Certain general considerations
respecting the mechanical treat-
ment of chronic diseases of the
joints. With especial reference
to the use of traction.

80. New York, 1878.

Reprinted from The Med. Record, Jan'y. 12. 1878.]

CERTAIN GENERAL CONSIDERATIONS
RESPECTING THE
MECHANICAL TREATMENT OF CHRONIC
DISEASES OF THE JOINTS,
WITH ESPECIAL REFERENCE TO THE USE OF
TRACTION.*

At the present time, in this country at least, the use of some form of mechanical appliance is very generally recognized as a proper part of the treatment of a chronic joint inflammation. The form, the principle of action even, of this appliance, will vary with the ingenuity and the pathological views of the practitioner, but the striking fact is that each endeavors to accomplish the cure by the use of an agent the action of which upon the diseased articulation is directly mechanical as distinguished from medicinal. I say striking, because such practice is not only at variance with, but to a great degree is a reaction against, that considered thoroughly established a generation, or less than a generation ago. Mechanical treatment in the sense and for the purposes that it is now used is of very recent date, and its introduction into general use is the work of men still living. The treatment which it has in part displaced was that based upon the theory of the exclusively constitutional origin of all chronic arthropathies. Any chronic indolent joint inflammation not evidently due to the rheumatic, the gouty, or the syphilitic taint was judged to have its

* Read before the Surgical Section of the New York Academy of Medicine.

origin certainly in the scrofulous diathesis. The inference directly followed that a diathetic disease could be successfully met by constitutional remedies alone. The judiciousness of meeting the arthritic expression of the diathesis by appropriate local surgical treatment was rarely appreciated, and the management of a diseased joint was generally as purely medical as that of a strumous adenitis for example; amputation in the one instance, extirpation in the other, being resorted to when medical resources had failed.

Probably the more practical surgeons always resorted to local support of a diseased joint. At all events, Brodie, as long ago as the first appearance of his well-known work, was fully aware of the value of fixation of joints by splints to insure their quiet. He seems, too, to have used traction, but only to overcome deformity. But the earliest record with which I am acquainted of the use of traction definitely for the cure of joint troubles is in the *Medical Examiner* of January 19, 1839. Dr. Harris, of Philadelphia, there reports certain cases of hip-disease treated by Physick's splint, followed by paste-board splints, and another treated by Gibson's Hagedorn's splint. Later, Dr. Alden March, of Albany ("On Coxalgia, or Hip-Disease." Trans. Am. Med. Ass., 1853), developed the use of traction in hip-disease, basing his treatment partly upon certain pathological investigations, but mainly upon the clinical observation of the relief afforded by such traction. Then followed, within the next few years, a rapid elaboration of the idea and a substitution of traction by means of portable apparatus for traction made while the patient was in bed.

The only safe basis upon which a plan of treatment can rest is that of clinical experience. This particular plan was gaining strength through the facts observed as to the relief of pain, the diminution of deformity, and the probable abbreviation of the duration of the disease by its use, when it unfortunately became involved in a dispute with which it had no necessary connection: the dispute, namely, as to the etiology of this whole class of diseases. Whether this entanglement was the result of the coincident discussion of the two subjects, or whether it was due to the illogi-

cal zeal of those who believed that if the new treatment was right then the old theory of causation was wrong, I do not pretend to say. But at all events the controversy was regrettable since it made what should have rested upon an experimental ground alone, contingent upon the settlement of an etiological and pathological question. Thus, a subject of great interest and importance was made a hindrance to the proper consideration by one yet more important.

It is in no way the object of this paper to attempt any discussion of the relative value of struma and traumatism as factors in the causation of joint diseases. But as an indication of the futility of endeavoring to attack or defend the mechanical plan of treatment upon any etiological theory, it may be worth while to quote some of the definitions of the word scrofula.

Mr. Savory, in the beginning of the article upon scrofula in "Holmes' Surgery" (Vol. I.), says:

"Scrofula is, in one respect at least, an unfortunate word, for it is not clearly defined. On the contrary, very different significations are attached to it. It has certainly become a vague term, so that wherever met with it is necessary to refer to the context to obtain an idea of the sense in which it is employed. For example, by some it is applied to a certain state of constitution, and by others to the disease which results from it. Again, it is often applied to all the diseases which, arising in a certain state of the constitution, possess some general features in common; while it is sometimes limited to the absolute deposit of tubercle, being simply synonymous with the more modern phrase tuberculosis. Finally, the confusion reaches its climax by the introduction of the adjective scrofulous, which is, and perhaps ought to be, if used at all, employed in the same sense as the substantive, but it is applied more frequently, at least in conversation, as a less definite term to doubtful cases, when the features are obscure and the diagnosis uncertain.

"It is necessary to state, then, that in these pages by the term scrofula is understood a certain disease or

defect of the constitution in which there is a tendency to produce and deposit a substance called tubercle in various tissues and organs. Tubercle may therefore be said to be the essential element of scrofula." A little later tubercle is described so as to include both the miliary tubercle and the cheesy tubercle. Mr. Savory certainly does not exaggerate the confusion regarding the matter. Writers that were of the greatest authority when some of those present were students, Samuel Cooper and Abernethy, for instance, generally avoid a definition. Cooper, in his "First Lines," speaks simply of local manifestations; nor in his "Dictionary" does he venture upon a definition, but while describing the local expressions of the disorder, combats the idea that these are the primary disturbances, and holds to an antecedent cachexia. Mr. Abernethy ("Lectures") says in his peculiar abrupt and practical way:

"Now the glands are peculiarly liable to be disordered in a bad state of health, and we call it scrofula; that is, if the disordered state continue for a long time. To say that the absorbent glands are not subject to scrofula would be absurd. We know that they are; there is every symptom of scrofula; there is an indolent tumefaction, succeeded by a more active degree of inflammation, followed by a secretion of a curdy kind of matter, called scrofulous matter. I am very adverse to calling all intractable diseases cancerous, or all indolent diseases scrofulous. There are many indolent diseases of the absorbent glands that are not scrofulous," and more to the same effect. The matter was certainly not by him clothed with any unnecessary prolixity.

But of late years the attempt has been made to establish the real nature of scrofula, and most writers experience a difficulty similar to Mr. Savory's in framing a definition, although they agree in many points upon the essential peculiarities. One insists upon inveteracy and the tendency to cheesy degeneration—another upon the non-vascularity of the products, etc. One of the writers, Birch-Hirschfeld ("Ziems-sen's Cyclopædia"—Am. Trans., Vol. XVI., p. 761),

after a preliminary discussion of about twenty pages, says:

"Having premised these general remarks, we may try to give a short definition of scrofulosis. Leaning on previous definitions, especially those furnished by Virchow and Billroth, we may designate scrofulosis as a constitutional anomaly which shows itself by changes partly of an inflammatory, partly of a hyperplastic nature, excited in the tissues by a comparatively slight noxious influence, changes which are endowed with insufficient recuperative power, and are therefore prone to lapse into regressive metamorphosis and, following thereupon, into local tuberculosis."

In the essentials of this definition, Rindfleisch, in his article upon tuberculosis in the same work (Vol. V.), concurs.

So Hueter ("Allgemeine Chirurgie," p. 731) recurs to the necessity of every writer defining what he means by scrofula. He adopts nearly the definition of Billroth and gives: "Scrofulosis is characterized by an increased inflammatory irritability of the body and by a tendency of existing inflammations to extension both as to space and to time." But with Hueter an assumed dilatation of the lymphatic vessels and a consequent ready ingress of monads plays an important rôle.

In making these quotations I have not sought to multiply them, but have taken simply those in works within reach from my writing-table. One more quotation shall be the last. It is from Flint's "Practice" in a brief article on scrofula. After giving a list of disorders "considered as local expressions of this diathesis, or, at least, as deriving from it important modifications," the author says: "That these affections involve a morbid constitutional state, either congenital or acquired, is undoubtedly true; but that they originate in a special cachexia is by no means certain. Even in children who have a scrofulous affection of the glands, the concurrence may be accidental. It is certain that the various affections just named are often observed in cases in which the glands are not affected; and *per contra*, the glands

are often the seat of scrofula without the coexistence of any of the other so-called scrofulous affections."

These quotations have been adduced with no purpose to establish a theory of scrofula or of its effect in joint diseases, but simply to show that if the mechanical treatment of these diseases is to stand or fall with any such theory, we have yet to wait a long time for the decision.

Still further is it regrettable that the question of treatment and the question of etiology should have thus become involved, since the fervor of controversy has driven many to take up positions which I suspect they do not soberly purpose to defend. Much of the acrimony of the discussion is doubtless due to mutual misapprehension. The issue is mainly one of terms. For, while one party claims that these peculiar inveterate joint diseases arise from struma, and the other party is equally sure that ~~it~~ must have arisen from an injury, the one means that whatever injury may have been received, such a white swelling cannot be developed without a previously existing scrofulous diathesis; and the other, that whatever the diathetic taint, the local disease is excited by an injury received at that point. In a very considerable proportion of cases the evidence of the existence of both the diathesis and the traumatism is conclusive. In other cases again, the history of struma is plain, and that of injury obscure; and on the other hand, cases may be traced to a distinct injury while but uncertain symptoms of a vulnerable diathesis exist. These cases are seized upon by the disputants, each emphasizing those that impress him, and ignoring those which are convincing to his antagonist. And yet he would be a bigoted diathesist who held that an injured joint was no more susceptible to inflammation than an uninjured one, and he would be a hardy traumatist indeed, who should deny the influence upon a synovitis of the constitutional condition of the patient.

But in detail the believer in struma enlarges his definition of that word and cross-examines the patient as to his personal and ancestral health with a minuteness that would lead the strongest and soundest to confess "there is no health in us:" and the traumatist

carries his point so far that a hydrops articuli or a synovitis following—say scarlatina—is attributed to an assumed sprain received in turning in bed. The debate might be prolonged as indefinitely as that famous one in the colored debating society on the question, “Which is the mother of a chicken, the hen that laid the egg, or the hen that hatched it?” It would indeed not be of particular interest in this connection were it not for the tendency to forget that a disease may be at once scrofulous and traumatic, and that the exclusive adoption of one or of the other side of the controversy is likely to lead to the abuse or neglect of **mechanical treatment**.

The abuses that arise from belief in the exclusively diathetic origin of the disease, are the reliance solely upon antidiathetic treatment, and the neglect of several evident surgical needs. Thus, pain is allowed in many cases to continue which could be relieved by the proper use of traction, and distortions are allowed gradually to occur, which likewise could have been prevented. These two claims of the mechanical treatment should insure its use, whatever views regarding the diathesis a practitioner may hold, unless he is prepared to show, or is at least convinced, that mechanical treatment delays recovery, or in some other way is sufficiently disadvantageous to offset its evident benefits.

On the other hand, the too eager traumatist may fall into the error of trusting as fully and exclusively to his apparatus as he would to his splints in the treatment of a fracture, and of utterly neglecting the constitutional condition of the patient. The psychical effect upon the patient or his friends (the ocular evidence, namely, that “something is being done”), is such that there is often a tendency to construct apparatus for cases that would be quite as well without it. The commoner disadvantages, however, are: 1. The general practitioner, even if he be desirous of trying new plans, has ordinarily little knowledge of mechanical appliances, and little time to study or adapt them, and consequently relies mainly upon the instrument-maker, who is ignorant, at least, of the whole surgical aspect of the question.

2. When a machine has thus been provided, both attendant and patient are likely to trust to it as if it had some occult power, and are confident that "the best is being done," when real and serious neglect exist.

3. This neglect, combined with the extravagant expectations entertained by the patient, and perhaps encouraged by the attendant, pretty certainly leads to disappointment; and,

4. By a natural revulsion the whole plan of treatment is abandoned, and a fair amount of advantage that might have been obtained is thrown away.

Are It is always a thankless, often a hazardous task to endeavor to estimate the relative or actual value of contending theories. Yet, generally, as in this instance surely, the only safe ground is between the extremes. Both theories rest on facts; error comes in only when exclusive dogmas ~~will~~ built upon a part of the facts. Error always will come when the one safe plan of meeting as far as possible empirically all the indications is deserted. In regard to the diseases under consideration, this plan demands that a practitioner should be on the alert to detect any diathetic condition to be combated and, if possible, corrected. He will not be blind to syphilitic manifestations, nor to those of rheumatism or rickets. He should be as watchful for those of scrofula or any other form of cachexia. And according as he detects these, will he modify not only the constitutional treatment, but perhaps even the local surgical appliances. On the other hand, I must repeat, whatever the cachexy, he cannot be excused from seeking to relieve the local trouble by appropriate surgical dressings.

We gladly then pass to an attempt to estimate the general mechanical indications, in a wide sense, of the local treatment of diseases of joints, and in a general way to suggest some of the principles that should govern the choice of mechanism.

+ The local indication in all cases of the kind we are considering, during the activity of the disease, is rest of the affected articulation. This fact is sufficiently well established by clinical experience and may be explained by reference to the physiological law that all use of a part of the body is attended with a flux of

blood toward that part. Hence, motion of a joint brings blood to it, already hyperæmic from disease, and the inflammation must be increased thereby.

Now, in some cases of synovitis the joint seems to gain sufficient rest if the patient simply keeps the bed or, at most, has the limb supported in such a way as shall relieve it from motion, strain, or tension. These are cases which lead to doubt and dispute whether they are cases of simple synovitis, or whether they are essentially the same as those others that subsequently become synovitis fungosa or white swelling. And herein lies the chief objection to treatment, at least for any considerable time, by confinement to bed, that namely in cases where the constitution is such as to make the occurrence of fungous synovitis probable, the disadvantage in want of air and sunlight, and the disturbance of function due to confinement, will probably fully balance the good obtained by the rest. In cases of fair constitution, where simple rest is sufficient to meet the symptoms of the arthropathy the general condition may be kept up by the means of massage, not applied to the affected joint, but to the person in general. The circulation, condition of the skin, and, as a consequence, the general nutrition, are thus improved.

Again, cases occur where although the patient, a child for example, is kept in bed, he is only nominally at rest. He is incessantly active, and the bed is only a more restricted field of operation. I can recall a case of hip-disease that was distinctly worse—though under active treatment and constant care—after Saturday holidays, because the other children played in the sick room, and the invalid endeavored, to the best of his ability, to do his share of the romping. Eventually this little fellow was sent away from home, to gain a rest he could not otherwise obtain.

But if the inflammatory action be quite acute, an enforced rest of the joint beyond that obtained by simple recumbency will probably be necessary. This may be secured by the use of almost any kind of simple splint properly adapted to the contour of the joint and trunk or limbs above and below. The particular

material selected is often a matter of indifference, although one may chance to suit an individual case better than another, or may better accord with the tastes of the attendant. Among the best are leather, and the starch, glue, or plaster-of-Paris bandages. They should all be so arranged as to admit of ready removal for the inspection of the joint, or for other purposes. This involved no real loss of fixation; for although the immovable dressing seems at first to be more secure, it very soon loses its exact conformity to the surface of the limb, and unless it be frequently changed, it speedily ceases to be of more value than a simple padded splint would be.

If, however, there be much muscular spasm, appliances of the sort described will rarely be sufficient. Indeed the advance of the disease to a point where the muscular spasms become a prominent symptom is often, I am sure, due to the real, though not evident, inefficiency of the retentive dressing. When the muscular spasm is urgent, fixation cannot be secured, save by the use of a force as constantly acting as that which is to be overcome, and the agent best adapted to this purpose is *traction* or, as it is generally called, *extension*. The word *extension* is objectionable because of its obscurity, since it is used as the opposite of *flexion*; and in the treatment of fractures the agent traction is called by the name of the object sought, namely, the *extension* of the broken bone to its normal length, and, probably as a result, the expression *extension* in this connection involves a false supposition which I shall mention later. Under *traction* I mean to include all methods of applying it, whether by simple weight and pulley, elastics, or by the various forms of portable apparatus that are applied to the person, and are so arranged as to make traction directly or indirectly upon the diseased articulation.

Traction may be used: 1st. As a means of relief when the disease is active and acute; 2d. To remove or correct deformities resulting from the disease after the latter as such has ceased; or, 3d. It may be used for other purposes during the activity of the disease, or to prevent anticipated distortion. The second use of traction is purely mechanical, like the application

to the treatment of fractures, and its particular methods and modification must vary with the mechanical obstacles to be overcome. Now I am not aware that any one has ever claimed that traction in and of itself exerted any curative influence upon a synovitis or upon osteitis or caries of the joint-ends, although the excess to which the treatment has been carried by some injudicious practitioners would suggest that they acted upon a theory that the benefit could be calculated by a mathematical formula, and that it was directly proportional to the tractile force employed. Its most intelligent and ardent advocates employ and advise it simply because clinically it is the best method, all things considered, of securing true rest of a diseased articulation. In order that it should be so employed as to deserve this praise a number of things are to be considered, for traction misapplied certainly is of no use, and often is downright distressing, and in many ways harmful.

The crucial test as to the propriety of using traction is, does it or does it not give relief—I am now speaking of its use while the disease is in progress. If it does, it is certainly indicated, if not, it is of doubtful utility; if it occasions distress, it is certainly contraindicated. But before deciding that it does not give relief, we must answer at least the following questions:

1st. *Has the traction been long enough continued?*

In order that it may do any real good, the traction must be long continued, although the relief of pain may be immediate and continue as long as the traction is employed, yet as the disease is very inveterate and slow in changes, any plan of treatment that aims to be successful must be persisted in for a long time.

2d. *Is the amount of traction proper?*

It sometimes happens that the traction is insufficient and but partially overcomes the muscular spasm. In that case addition to it will give the desired relief. But it is quite as likely to happen that the traction is unnecessarily great. The relief gained is not, as was formerly imagined by some, from the separation of diseased surfaces. This separation is scarcely possible under any amount of force likely to be employed by

a surgeon ; and again, it is very probable that whatever separation could be accomplished has already resulted from the effusion within the joint. The relief is gained simply from the prevention of muscular contractions which violently grind together the inflamed and perhaps eroded surfaces. The aim of the surgeon should then be, not to use all the traction that can be tolerated, but to use the smallest amount that will ensure the rest of the articulation.

3d. *Is the traction made in the right direction?*

It should always be borne in mind that the position in which the limb, a joint of which is diseased, is found, is not the result of accident. In the first place the muscular spasms, resulting from the joint irritation, change the position of the joint from the normal one. But the irritation affects not a single set of muscles alone, but several, and their contraction varies according to the relative strength of the muscles and the degree of irritation. The limb cannot follow the dictates of each group, and the position assumed would express the resultant of their forces were it not that there is added a certain amount of instinctive or semi-voluntary muscular action, having for its object the diminution of or abolition of motion in the joint. The position of the joint then—excepting cases where adhesion exists, or where some muscles may have become contracted—represents the equilibrium of the muscles to prevent attrition. The position of fixation is probably not painless, and is not maintained without serious effort, but it is generally the attitude of minimum suffering. This position of equilibrium should not be rudely disturbed, for an attempt to suddenly change it causes a spasm of those muscles at the expense of which the change is effected, and this spasm will cause pain, possibly trivial but most probably agonizing. If in such a case then we desire to make traction, we should first see that the tractile force is applied in such a direction, or in such directions, as shall exactly supply the place of the muscular contractions, if they have been sufficient to keep the patient free from acute pain. Then, when the relief of the pain allows the muscles to relax, the direction of the traction may be gradually changed from

that first assumed to that calculated to bring the limb into the desired position. To illustrate: A diseased hip with strong contraction of the flexors of the thigh will be rather irritated than relieved by traction (by weight and pulley) horizontally when no allowance is made for the angle of flexion. The insertions of the contracted muscles become a fulcrum, the traction will move the thigh in an angular direction, like a lever, and the effect will be to crowd the head of the femur into the acetabulum instead of preventing such crowding. So in a contracted knee, and generally.

In a similar way traction may defeat itself through the tension of muscles and become a real compression of the diseased joint: thus, when the synovial sac of the knee is much distended with liquid, traction from below the knee may act simply to compress the subpatellar enlargement beneath the rectus and the vasti, or in the same way to crowd eroded surfaces together. In such a case these muscles must be relaxed by position or by strapping them *toward* the joint.

4th. *Is the traction acting on the proper joint?*

Where, as is generally the case, the joint diseased is in a limb, any traction applied to the extremity of that limb will be distributed over the various joints. Some of them would be thus subjected to unnecessary or injurious traction. The method of applying the force should therefore be such that all joints between the point of application and the joint to be acted upon should be efficiently protected against the traction. The particular means of protection must vary with the kind of traction employed.

The length of this paper forbids my entering upon any discussion of the general principles of portable traction instruments. It may facilitate discussion, if I recapitulate the points I have endeavored to establish.

1st. The origin of the mechanical treatment of joint diseases was empirical.

2d. That the involving of the discussion of this plan of treatment with a question of etiology is unfortunate and unwarrantable, since the etiological dispute is largely one of terms, and is yet too far from settlement

to be allowed to dictate what shall be the surgical treatment.

3d. That too eager espousal of the one or the other side of the controversy may lead to abuses.

4th. That in any event the merits of a local mechanical treatment are sufficient to demand its employment.

5th. After speaking of some simple means of retention, I have enumerated some of the essentials of the proper use of traction.

